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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,719	02/01/2006	Akira Ohbayashi	060109	7473

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EXAMINER	
ARNBERG, MEGAN C	
ART UNIT	**PAPER NUMBER**
1796	
MAIL DATE	**DELIVERY MODE**
12/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/566,719	OHBAYASHI ET AL.	
	Examiner	Art Unit	
	Megan Arnberg	1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 April 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 February 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :04/26/2007; 07/21/2006; 02/01/2006.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 12-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 12 recites the limitation "nongel-like thermosetting resin" in line 2. There is insufficient antecedent basis for this limitation in the claim. For the purpose of further examination it is taken to mean the nongel-like epoxy resin.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haraguchi et al. (WO 03/037985) in view of Hanson et al. (US 2002/0168527). Citations made to the PCT refer to the English language equivalent (US 2004/0254328).

Regarding claim 1: Haraguchi et al. teaches an epoxy resin composition (para. 2) comprising: an epoxy resin having two or more epoxy groups in the molecule (para. 24) as well as an amine (para. 18) and a borate compound of the formula $B(OR)_n(OH)_{3-n}$ (General Formula (1)) where n is 1-3 and R is a C_mH_{2m+1} alkyl group where m is 1-10. Not disclosed is the polyamine borate obtained from the reaction of a polyamine compound having at least one of amino group and imino group in the molecule and the borate compound. However, Hanson et al. discloses an epoxy resin composition (para. 2) with a curing agent of the reaction of amines, specifically melamines with Lewis acids, specifically oxides and hydroxides of boron as well as amine-boron complexes (para. 69). Melamine has amino and imino groups. Haraguchi et al. and Hanson et al. are combinable because they are both concerned with the same field of endeavor, namely epoxy resins for copper clad laminates. At the time of the invention a person having ordinary skill in the art would have found it obvious to combine the reaction product of Hanson et al. with the composition of Haraguchi et al. and would have been

motivated to do so for such desirable properties as flame retardancy in addition to curing.

Regarding claim 2: The epoxy equivalent can be from 130-1000 (para. 35).

Regarding claim 3: Haraguchi et al. teaches the polyamine compound is an aliphatic polyamine, an aromatic polyamine and an alicyclic polyamine (para. 37).

Regarding claim 4: While the ratio of the content of the nitrogen-containing group of the polyamine compound to the content of boron of the boric acid compound is not taught, the experimental modification of this prior art in order to ascertain optimum operating conditions fails to render applicants' claims patentable in the absence of unexpected results. See *In re Aller*, 105 USPQ 233 and MPEP 2144.05. At the time of the invention a person having ordinary skill in the art would have found it obvious to optimize the ratio of nitrogen to boron and would have been motivated to do so for such desirable properties as effective flame retardancy and reactivity with epoxy groups. A prima facie case of obviousness may be rebutted, however, where the results of the optimizing variable, which is known to be result-effective, are unexpectedly good. See *In re Boesch and Slaney*, 205 USPQ 215.

Regarding claims 5 and 6: While the amount of polyamine borate is not taught, this is a result-effective variable which can be optimized. At the time of the invention a person having ordinary skill in the art would have found it obvious to optimize the amount of polyamine borate in the composition and would have been motivated to do so for such desirable properties as fast curing without effecting the properties of the resin as well as increased flame retardancy.

Regarding claim 7: The components of the composition are dissolved in a solvent including lower alcohols (para. 50).

Regarding claims 8 and 9: Haraguchi et al. does not teach additional curing agents. However, Hanson et al. teaches additional curing agents such as dicyandiamide, phenol novolak resins and imidazoles (para. 69). At the time of the invention a person having ordinary skill in the art would have found it obvious to combine the curing agents of Hanson et al. with the composition of Haraguchi et al. and would have been motivated to do so for such desirable properties as complete curing and economically viable compositions.

Regarding claim 10: Haraguchi et al. teaches a method comprising heating while avoiding gel formation (para. 58).

Regarding claim 11: Stirring until the components are dissolved to a micron size is taught (para. 59) in an epoxy diluted with solvent (para. 50).

Regarding claim 12: The solvent is removed by drying at a temperature of 40-120°C, which overlaps the claimed range (para. 65).

Regarding claim 13: Grinding/crushing the solid resin is disclosed (para. 65).

Regarding claim 14: A cured product/article is taught of the composition cured with compression molding under heat (para. 66).

Regarding claim 15: Haraguchi et al. teaches a method for producing a heat-resistant laminate sheet, which comprises: providing an uncured coating film layer of the epoxy resin composition on the surface of a heat-resistant substrate sheet; laying/layering another heat-resistant substrate sheet on the uncured coating film layer;

and curing the uncured coating film layer with thermocompression bonding/thermal contact bonding (para. 17)

Regarding claim 16: The heat-resistant laminate sheet can be copper (para. 62).

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Specifically, Cunningham et al. (U.S. Pat. 6,057,078) and Ishidoya et al. (U.S. Pat. 6,403,670) appear to teach the composition.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Megan Arnberg whose telephone number is (571) 270-3292. The examiner can normally be reached on Monday - Friday 7:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Eashoo can be reached on (571) 272-1197. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Megan Arnberg MCA
December 6, 2007

MARK EASHOO, PH.D.
SUPERVISORY PATENT EXAMINER

05/Dec/07